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CURRENT STATUS OF THE PRONGHORN (*Antilocapra americana*) IN MEXICO: A SURVEY

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I. INTRODUCTION

One of the most serious problems which we face in the study of wildlife is the lack of baseline information ["past information"] with the result that it is extremely difficult to prove that such and such a species is diminishing and the causes that have brought about the current situation.

Fortunately, the history of the pronghorn is well-documented, although not in a continuous manner. We have data on the species that date from 1540 (Leopold 1959), and from which we know that the pronghorn extended as far south as the dry plains of the northern Valley of Mexico and that it occurred in great numbers in the northern states (Lumholtz 1902). Nontheless, the pronghorn was already becoming scarce toward the end of the 1800's, and at the end of the century had disappeared from a great part of its original area of distribution (Mearn 1907, Hornaday 1908). These two authors were the first to call attention to the rapid disappearance of the pronghorn, especially in the southwestern United States and in Mexican territory where, according to them, it existed in the thousands. Given this situation, a first attempt was made to evaluate the populations of this animal, and it was Nelson who, in 1923-24, completed the first census of the species, calculating the following Mexican populations: Coahuila, 600 animals, Sonora 595, Baja California 500: total of 2395 pronghorn. It should be mentioned that by that time the pronghorn had already disappeared from the rest of the republic.

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The pronghorn has always been considered one of the most coveted hunting trophies. This species has traditionally been hunted by the natives and colonists who, as in the case of the Papagos, Pimas, and Apaches, sometimes depended on it in large measure (Hornaday 1908, Tinker 1978, Leopold et al. 1981).

Hunters' desire for this trophy and the growing need to feed rural populations within the areas of distribution of these animals (which in the main are of little value to agriculture, and in some areas, to ranching), together with the destruction of habitat and continuous hunting have been responsible for the drastic decrease of this species.

OBJECTIVES AND GOALS

It is the purpose of this study to carry out a survey on the current status of the species in Mexico, which will permit us to accomplish the following objectives within a short space of time:

1) To determine, as precisely as possible, the current distributions of the three subspecies found in Mexico,
2) To determine, as precisely as possible, the current status of pronghorn populations (density and population structure),
3) To diagnose and evaluate the different factors acting in detriment of its populations (climate, predation, hunting, loss of habitat).

Fulfillment of these objectives will permit formulation of a plan of action to protect and restore pronghorn populations. This plan would bear fruit in the longterm.

II. METHODOLOGY

Two field trips of 20 days each were made to the following areas: Northwestern part of the state of Sonora (Altar Desert) and north central part of Chihuahua.

The study areas were worked primarily on the basis of maps and aerial photographs to delimit the areas and characterize the habitat. At the same time a literature search on the subject was made.

The following methodology was observed during each trip:

1) Runs in car along highways, neighboring roads, and lanes recording distance and time of run and number of animals seen and|or calculated by local inhabitants or other investigators.
2) Walks following fixed observation routes, recording distance and time of walk, and animals sighted and|or signs and traces of their activity.
3) Fixed observation sites with definite times (2 hours per site). The sites were chosen on the basis of fresh traces, and the number of hours was determined in each case (the first hours of the morning and evening were used).
4) Two types of censuses were carried out: a) direct (animals sighted) b) indirect (spoor and droppings counts); these latter were carried out in marked transects.
5) The following data were recorded for each record:
   a). Direct observations. Locality, habitat, date, hour, number of animals, sex, relative (approximate?) age, and activity.
   b). Indirect observations. Locality, habitat, date, hour, type of traces, and probable number of animals.

6) For each locality where animals and|or their signs were observed the following data were recorded: browsed plants, resting places (nests), availability or nearness of water (dams, springs, wells, and tinajas), description of exact habitat and possible sources of perturbation (agricultural zones, cattle, habitat destruction, hunting, predators, etc.).

7) Questionnaires on the subject were drawn up and filled in by information from farmers, ranchers, hunters, and other persons from different sectors.

8) A temporary monitoring plan was implemented using some local persons in order to obtain a larger number of observations.

III. RESULTS

III.1. Distribution of the pronghorn.

Historical distribution of the pronghorn in Mexico included all of the altiplano to western Hidalgo and north of the state of Mexico, toward the east, all the central and northwestern region of the state of Sonora, in the plains to the east of Sierra de San Pedro Martir in Baja California Norte, all the length of Baja California Sur except for the sierras and southern tip. The distribution of the pronghorn in Mexico followed the geographic pattern of the Chihuahuan, Sonoran, and Vizcaino deserts, by which we may consider it an inhabitant of the semiarid and arid plains of Mexico (Fig. 1).

Today its area of distribution is scarcely 5 to 10% of the original area. The decrease in this area was very drastic; in 1723 (Leopold 1959) pronghorn could still be found in the Valley of Mexico, by 1911 (López and López 1911) it had disappeared from the valley and occurred only in San Luis Potosí, Zacatecas, Durango, Coahuila, Chihuahua, Nuevo León, Sonora, and the Baja Californias. Between 1922 and 1924 the pronghorn occurred only in the Baja Californias, Sonora, Chihuahua, and Coahuila (Nelson 1925), and by 1949

only in the zone comprising north-central and eastern Chihuahua, Altar Desert and Sonoyta, and in the Vizcaino Desert in Baja California Sur, with a few isolated specimens in Coahuila and Nuevo Leon and in the plains of Baja California Norte (Leopold 1959).

In 1984 pronghorn is found in Mexico only in some localities in Chihuahua, in the zone of El Pinacate, in the Vizcaino Desert, and in a small portion of Coahuila (Figs. 2, 3, 4, and 5).

III.2. Habitat occupied by the pronghorn.

Originally the pronghorn occupied the xerophilic brushland and meadowland. Today it is found only in the Chihuahuan Desert region of succulents and Larrea-yucca, in the Sonoran Desert in the division known as the Lower Colorado River region, and in the Vizcaino Desert (Shelford 1978). In Chihuahua pronghorn habitat includes the arid and semiarid zones of the state, where the dominant vegetation is microphillic brushland, medium, open meadows, and grumous grasslands [bunchy-grasses]. Principal vegetational species characterizing these areas are:

"Navajito" grass (Bouteloua gracilis, B. eriopada, B. hirsuta, B. curtipendula), "toboso" grass (Hilaria mutica) , and alkaline grass (Sporobolus airoides). In the microphyllic brushland the dominant bushes are "gobernadora (Larrea tridentata), "gatuño" (Mimosa biucifera), "cola de zorra" (fox tails) (Brickellia spinulosa), chollas (Opuntia imbricata), and "Palmilla (Yucca spp). The areas of distribution in Chihuahua range from 1,220 m to 1700 m above sea level. Mean annual temperatures vary between 14.5°C and 18.2°C. Average annual precipitation is 332 mm from June to November (Treviño 1977).

In Sonora present-day pronghorn habitat includes microphyllic brushland, microphyllic "subinermes," and grasslands of semimobile and fixed

dunes. Dominants in the area are perennial bushes like "gobernadora" (Larrea tridentata), "Chamizo" (Atriplex spp), and salt bush (Frankenia palmeri). Sahuaros (Carnegiea gigantreus) and palo verde (Cercidium microphyllum) are found toward the more humid zones. Grasslands are predominantly of "galleta" grass (Hilaria rigida). Interspersed throughout the zone are barren lands, plains dominated by grasses (Schismus arabicus and Aristida sp) which are very frequented by pronghorn. The altitude of the area varies from 3 to 400 m above sea level, and the average annual rainfall is from 64 to 200 mm; the climate is semi warm with temperatures between 10°C and 22°C as an annual average (Ezcurra et al. 1981).

In the Vizcaino Desert this animal has become confined to a small portion of the desert of Baja California Sur, where the dominant plants are "gobernadora" (Larrea tridentata), ocotillo (Fouquieria splendens), and various species of agaves (Agave spp). Mean annual temperatures are from 20° to 25°C, and precipitation varies between 100 and 200 mm. Elevation does not exceed 100 m above sea level (Brown 1982).

The topography of the three areas is level to slightly rolling. "Gobernadora" (Larrea tridentata), "Galleta" grass (Hilaria spp), and some succulents such as cholla (Opuntia spp) are very characteristic of the present-day and historical habitat zone of the pronghorn.

III.3. Current populations and population structure.

Chihuahua: data collected for the state resulted from surveys of 11 areas of the state (see Appendix 1 for localities) and information obtained through interviews with farmers and cattlemen of those areas (Table 1).

Table 1.

FARM AREA	No. ANIMALS REPORTED	No. ANIMALS SIGHTED	STRUCTURE ♂	♀	⊖	?
1	30	11	2	4	2	3
2	15	3	-	2	1	-
3	7	*	-	-	-	-
4	7	*	-	-	-	-
5	32	11	3	5	1	2
6	134	112	21	52	22	17
7	109	41	5	18	7	11
8	7	7	2	3	2	-
9	5	*	-	-	-	-
10	12	*	-	-	-	-
11	43	29	7	13	5	4
TOTAL	401	214	40	97	40	37
% of sightings		100	18.69	45.33	18.69	17.29

*Unconfirmed farm areas
⊖ Juveniles
? Unidentified

Table 1 shows a minimum population of 214 animals in the state, with a composition of 18.69% males, 45.33% females, and 18.69% juveniles, plus an additional 17.29% of unidentified individuals. If we take only the well-identified pronghorn, we find that there is 1 male for each 2.42 females (1:2.42) and 41 juveniles for each female (1 offspring for every 2 females). There were 401 reported animals, however, this number cannot be taken seriously because many of the reports are overestimations. Nevertheless, if we take the mean of reported and sighted numbers, I think we can get an adequate estimate of the state's pronghorn population, i.e., an estimated population of 307 animals.

Sonora: All the 12 areas surveyed (see Appendix 1) are located to the east of Pinacate Mountain within the municipality of Puerto Peñasco, beyond the plains to the north of the Gulf of Santa Clara. No vestiges of pronghorn were found. Table 2 shows the results of the census and information obtained from local inhabitants.

Table 2.

ZONE	No. ANIMALS REPORTED	No. ANIMALS SIGHTED	S T R U C T U R E		
			♂	♀	⊖
1	4	--	2 (J)	-	-
2	6	2	-	-	-
3	7	--	-	-	-
4	5	2	-	-	2
5	5	5	-	5 (J)	-
6	11	--	-	-	-
7	20	8	1	4 (J)	3
8	5	2	-	2	-
9	7	1	1	-	-
10	7	2	2	-	-
11	10	5	1	4	-
12	6	6	5 (J)	1	-
TOTAL	93	33	12	16	5
% of total		100	36.36	48.49	15.15

Table 2 shows a minimum population, in Sonora, of 33 animals with a sex ratio of 36.36% males to 48.49% females of which 21.21% of the males and 27.27% of the females are young animals. Juveniles account for 15.15% of the population. This gives us average figures of 0.71 juveniles per female (1 juvenile for each female) and 1 male per 1.33 females (Approx. 1:1), the same as for Chihuahua. Various persons reported different numbers of pronghorn none of which can, therefore, be taken seriously. Therefore, in order to obtain an estimated mean

we again divided the number reported plus the number sighted by 2 to derive an estimated population of 63 animals in the Altar Desert.

Baja California Sur: Due to circumstances beyond our control we did not visit the Vizcaino Desert, nevertheless, we know that the area is being studied by personnel of the Department of Terrestrial Flora and Fauna, although, unfortunately, there is no published information. Given this situation, and for purposes of comparison, we present here the data obtained by Hernández and published in 1980. The localities studied by this author [I think he means Hernández] were Rancho San José and the Voladores, Arroyo San José, and San José de Castro. The results were as follows:

Females - 45 (56.2%)

Males - 27 (33.8%)

Juveniles - 8 (10.0%)

This gives a total of 1.66 females per male and an average of 0.77 juveniles per female, i.e., one juvenile for every 6 females, more or less.

In sum, we find that for the three subspecies of pronghorn in Mexico, the populations are currently very low (Table 3).

Table 3. Current populations of the three pronghorn subspecies.

	MINIMUM POPULATION	MAXIMUM POPULATION	ESTIMATED POPULATION
Antilocapra americana mexicana (Chihuahuan pronghorn)	214	401	307
plains of Guaje Coahuila *	-	-	·12·
Antilocapra americana sonoriensis (Sonoran pronghorn)	33	93	63
Antilocapra americana peninsularis (Vizcaino pronghorn)	80	100	90
TOTAL	327	594	472

No asterisk note. Penciled * and circle around second entry - see Copy 9

As we can see in Table 4, the minimum pronghorn population in Mexico is 327 animals with an estimated population of 472. This last figure can be used to compare the current situation with estimates for other years by region and for the nation as a whole.

Table 4 is a chronological representation of the decrease of pronghorn population in Mexico during the last 60 years.

Table 4

POPULATION	LOCALITIES	DATE	SOURCE
2400	B.C.S., B.C.N., Sonora Coahuila and Chihuahua	1924	Nelson 1925
800	B.C.S., B.C.N., Sonora and Chihuahua	1973	Sundstrom 1973
695	B.C.S., Sonora, Chihuahua	1977	Hernández and Treviño 1980
650	B.C.S., Sonora, Chihuahua	1978	Tinker 1978
472	B.C.S., Sonora, Chihuahua, Coahuila	1984	

From Table 4 we can derive an 80.33% decrease in pronghorn populations in Mexico over a period of 60 years: of an original population, estimated by Nelson (1925) at 2400 animals, only 472 remain in 1984, a decrease of 1928 animals with an average loss of 32.13 animals per year. This average loss has not been constant, however. Table 5 shows the animal-loss trend in four well-documented periods. Table 5 shows clearly that in a single year, period 3 from 1977 to 1978, 45 pronghorn were lost; periods 1, 2, and 4 present an apparently similar loss, differing only in the length of the period.

Table 5. Trend in the decrease of animals during 4 periods (60 years) showing the decrease in numbers, percentage, and animals per year.

		Change in 60 years No.	%	Animals Lost per yr
Period 1	1924 - 1974	- 1600	- 66.66%	32.65
Population	2400 800			
Period 2	1973 - 1977	- 105	- 13.13	26.15
Population	800 695			
Period 3	1977 - 1978	- 45	- 6.47	45.00
Population	695 650			
Period 4	1978 - 1984	- 178	- 27.38	29.66
Population	650 472			

III.4. Current Problems

The problems facing the pronghorn populations in Mexico can be summed up in four principal factors:

1) Climate

2) Predators

3) Habitat destruction

4) Poaching

Of the four, the first two are the result of a natural, evolutionary process and one can do very little against them, especially climate. Pronghorn populations in Baja California and Sonora are subjected to one of the most extreme and hostile climates in Mexico. The areas lack available, free water for these animals' use; this results in a low fecundity ["fertility and reproduction"] for the majority of years. If to this one adds the fact that both the Vizcaino and Altar deserts sustain long periods of drought which on occasion last several years (with periods of as much as ten years without regular rains) we see that climate has been a great limiting factor in the growth of pronghorn populations.

As far as predators are concerned, there are several species within the areas of distribution of the pronghorn in the three states which could be potential predators. Very little is known, and we were able to find out even less on the subject, but the following are considered predators of the pronghorn: the mountain lion, puma, "royal" eagle, and coyotes--these last are of great importance according to studies carried out in the United States, Canada, and Mexico (Yoakum 1978, Mitchell 1980, and Alcorreca and Sánches 1981), especially when populations are small.

Coyotes are very abundant in the the three areas, nevertheless, their impact on pronghorn populations has not been demonstrated.

Not withstanding the preceding, we think that the principal factors responsible for the drastic decrease of pronghorn in Mexico are: habitat destruction in its two modes, a)total destruction for agriculture and urbanization, and b)irreversible changes due to overgrazing, this last very important in the states of Chihuahua and Sonora. The other cause is hunting, since the indiscriminate chase of these animals has never ceased. Hornaday (1908) is the first to call attention to the fact that the pronghorn are dying out in Sonora and Arizona. Later, in 1911, López and López call upon the authorities to put a stop to the slaughter of pronghorn, and relate how "hunters" in automobiles finish off whole herds.

We see, then, that uncontrolled hunting has been one of the principal causes for the disappearance of these animals. It is known, through trustworthy information of reliable people whose names are not mentioned for reasons of safety, that in the year 1984 alone "hunters" killed 26 pronghorn, 9 in the area of el Pinacate, 10 in Chihuahua, 5 in Coahuila, and 2 in Baja California. As we see, hunting continues to be a definite factor despite the fact that pronghorn have been protected since 1922, was declared a species in danger of extinction in 1973, and its relict

populations in Baja California and Sonora area located in areas designated as reserves. In spite of this, those areas are not respected, nor does there exist personnel to enforce respect.

From the foregoing we can say that, besides the four points mentioned there are two more which are very important and decisive in the current situation of the pronghorn. These are the indifference of the responsible authorities, and the lack of vigilance and support.

IV. CONCLUSIONS

Despite the fact that this study is general in character, and preliminary, we can clearly see that if the situation should continue as it has done up to now, the Sonoran antilope (Antilocapra americana sonoriensis) will have disappeared in about 6 years; it is probable that in 10 more Antilocapra a. peninsularis will disappear from the Vizcaino Desert, and it is possible that not too many years later not even ten pronghorn will be left in the state of Chihuahua. The situation is alarming and urgent measures are required, above all if we want to conserve the subspecies of Baja California and Sonora. It will always be possible to introduce the Chihuahuan pronghorn from the United States, since they have large populations of the subspecies A. a. mexicana.

As final conclusions we can say:

1) The pronghorn in Mexico is in real danger of extinction.
2) The principal motive for the rapid disappearance of the pronghorn continues to be poaching.
3) If immediate and specific measures are not taken, the pronghorn will have disappeared from Mexican territory in less than 15 years.

V. RECOMMENDATIONS

Having studied the current status of the pronghorn populations in Mexico and having analyzed the threats to its conservation, it is necessary to take various actions which guarantee preservation [permanency] of the species and will aid in increasing their populations.

The measures which we list below represent the basic elements of a program for conservation of this valuable species, above all for the subspecies of the Vizcaino Desert in Baja California Sur, and the Altar Desert in Sonora; as was mentioned before, the Chihuahuan subspecies can be reintroduced from Arizona or New Mexico, U.S.A.

1) Publicity campaign, at all levels, on the current status of the pronghorn (population, legal status, importance as a species).
2) Punish (in such a manner as to be a deterrent to others) all persons who kill one of these animals even within their landholdings (the fauna is the property of the nation).
3) Initiate a program of research and monitoring of the populations in their areas of distribution: this program should be continuous and to include the following subjects:
   a) Density and population structure
   b) Diet and carrying capacity of the area where they are found
   c) Impact of climate and predators on the populations
   d) Competition and effect of cattle on their density
   e) Inventory of areas suitable for pronghorn, for a reintroduction program.
4) Given the somewhat nomadic habits of some pronghorn populations due largely to a search for forage, but above all for water, establish a system of strategically distributed watering holes

in order to keep the animals longer in a particular place and facilitate study and protection; make a system of open pathways of their travel routes to prevent injuries due to wires, especially in Chihuahua.

As we have seen throughout this text, the pronghorn in Mexico inhabits the most inhospitable regions, characterized by lack of water. This has been a limiting factor in obtaining good reproduction, thus, a good system, or network, of watering places could save this animal.

5) Start a program of reintroduction to areas of good pronghorn habitat, good forage, water, and protection. Such areas should be chosen among the ranches and "ejidos" that are interested in the animals, and in reserves such as the Biosphere Reserves of La Michilía and Mapimí in the state of Durango. This program should consider importing some nuclei or breeding stock of the subspecies mexicana. This could be accomplished in a short time through SEDUE, Fish and Wildlife Service, WWF, IUCN, and other insitutions such as state governments or scientific institutions in Mexico.

6) In the case of the Sonoran pronghorn, it is imperative to have an area declared a preserve at whatever level. A proclamation is necessary in order to be able to implement a protection program.

7) Have a sufficient number of guards (rangers), interested and believing in what they are doing, who have logistic, economic, and legal backing in order to protect this valuable species.

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Finally, we can say that the protection of pronghorn in Mexico, as well as that of other species, requires:

1) Awareness and interest of the authorities
2) Awareness and interest of the communities
3) Awareness and interest of the scientists
4) Awareness and interest of the guards.

As we can see, it is not an easy undertaking, but if we want to conserve this animal we need to make a very large effort with an investment of millions and the participation of many institutions and people.

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Appendix 1

List of localities where the presence of pronghorn was verified in the different states:

COAHUILA

In the plains of the "Guajes," approximately 70 km south of Boquillas del Carmen and about 30 km from the U.S. boundary and the limits of the state of Chihuahua (see Appendix 2).

BAJA CALIFORNIA SUR

In the zone known as plain of the pronghorn between Guerrero Negro, Sierra Pintada, and Sierra de Santa Clara, principally in: (see Appendix 2)

1) Rancho San José de Castro
2) Rancho Los Voladores
3) Arroyo San José
4) Arroyo San José de Castro

SONORA

All localities are found to the north, northeast, and east of the volcanic shield of "El Pinacate" to a few kilometers beyond Sierra Pinta north of San Jorge Bay (see appendix 2).

1) Crater Celaya
2) Los vidrios service station
3) Salvatierra volcano and los Corralitos
4) Diaz Lake
5) Plains of the colorado crater
6) The hill and ranch of los vidrios
7) Plain of the pronghorns at the foot of Suvuk
8) Dunes south of Sierra Blanca

9) Sonoyta River south of the Batamontes.

10) Area of Sierra Pinta

11) Area of Sierra San Francisco

12) Area to the south of Sierra Cipriano

CHIHUAHUA

Since in the ["barrendera" = typo?] zone are ranches and cattle "ejidos," we give the names of the holdings for better localization (see map in Appendix 2):

Area	Names of holdings
1	The berrendo, El Palmar, La Compañía, El Boludo, and Nogales 2.
2	El Cuervo, La Nariz, La Chiripa, La Alcaparra and El Cactus
5	Las Tunas, Palos Blancos, El 24, El 25, Atotonilco, and Las Cuatas
6	Las Gregorias, El Terraceño, El Papalote, San Lorencito, El Agate, Coyamito Norte, Coyamito Sur, Mundo Nuevo, and El Sueco.
7	Tres Castillos, La Esperanza, Las Tuzas, Las Cuatas, Dos Hermanos, El Terboso, Los Colorados, Las Playas, El Ford, and San Eduardo.
8	El Antcojo, and La Gallina
9	San Miguel
10	El Berrendo, and Ojo de Villa
11	La Palma, El Cubano, Los Organos, El Becerro, and La Caramayola.

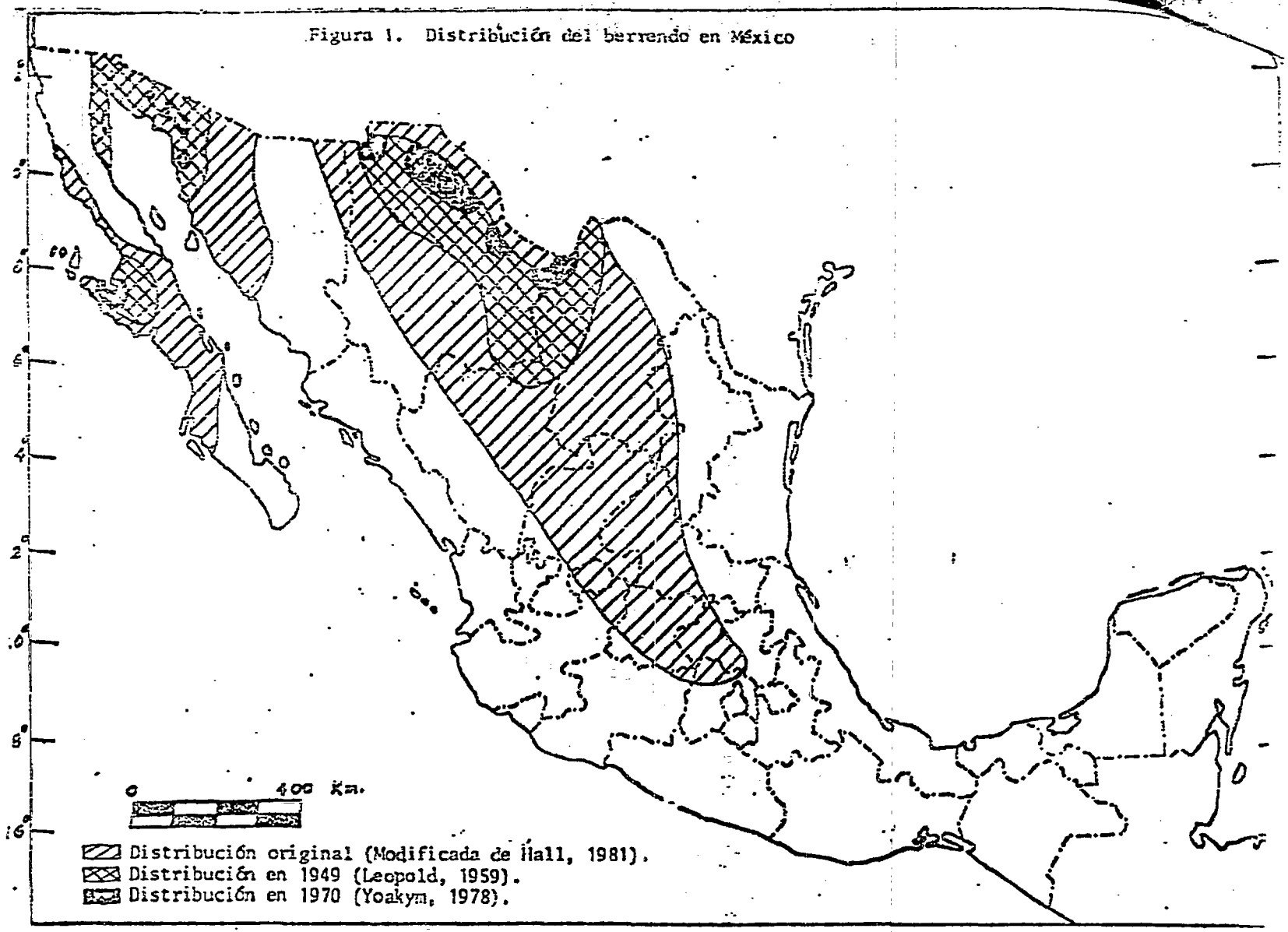
A N E X O 2.

Appendix 2

MAPAS DE DISTRIBUCION DEL BERRENDO

Pronghorn Distribution Maps

Figura 1. Distribución del berrendo en México



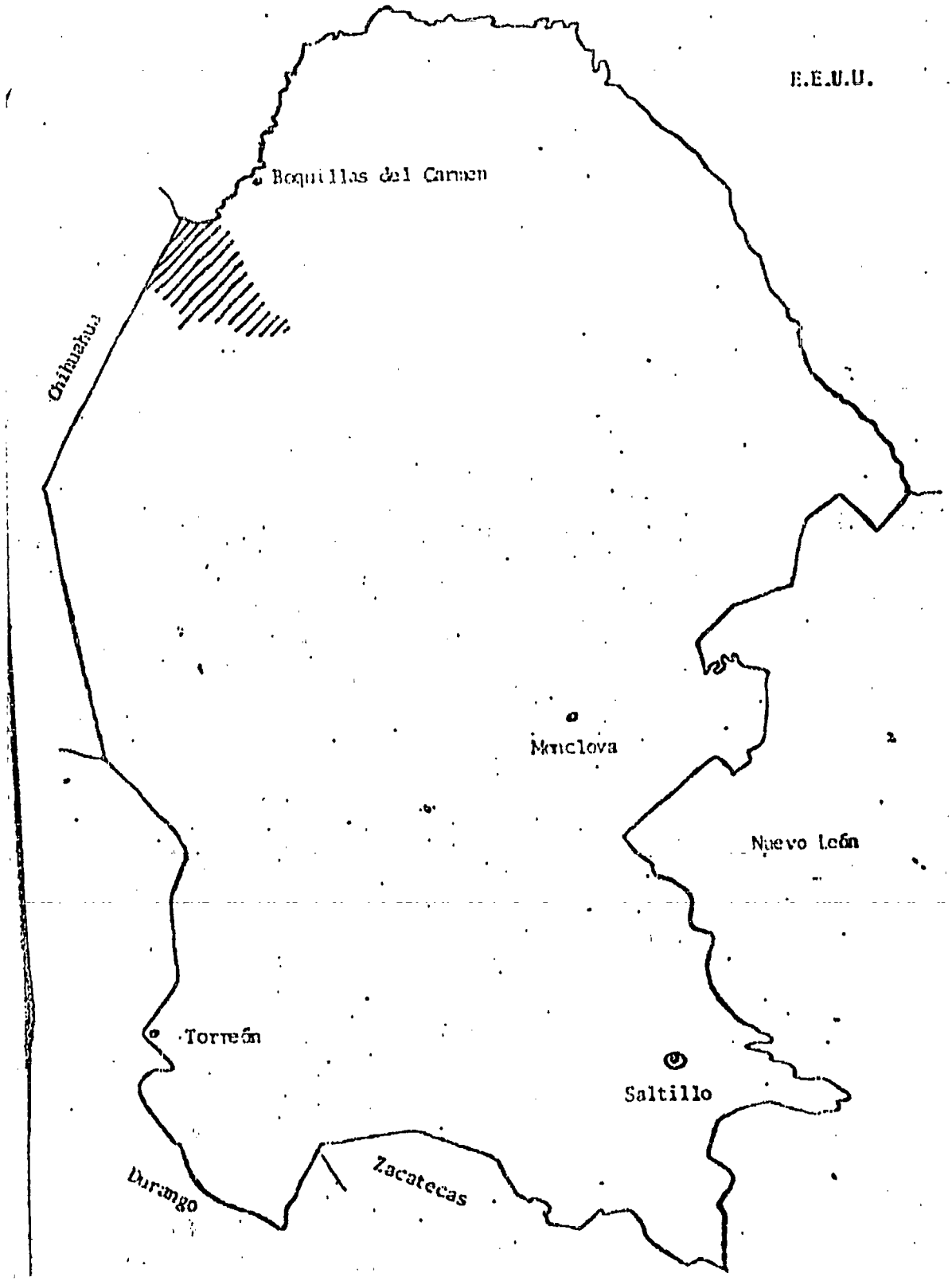

E.E.U.U.
Boquillas del Carmen
Chihuahua
Monclova
Nuevo León
Torreón
Saltillo
Zacatecas
Durango

Figura 3. Distribución de Antelocapra americana mexicana.

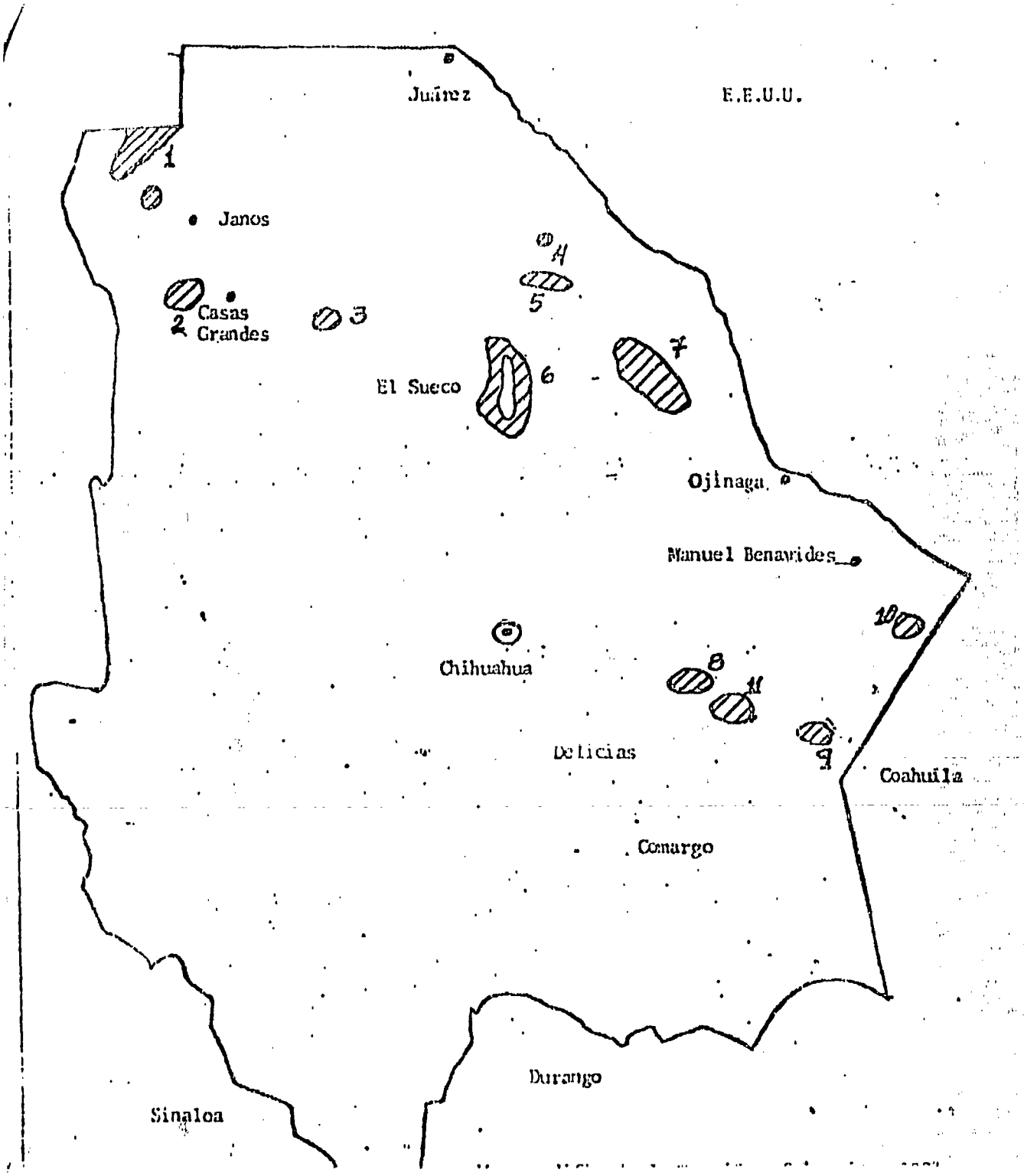
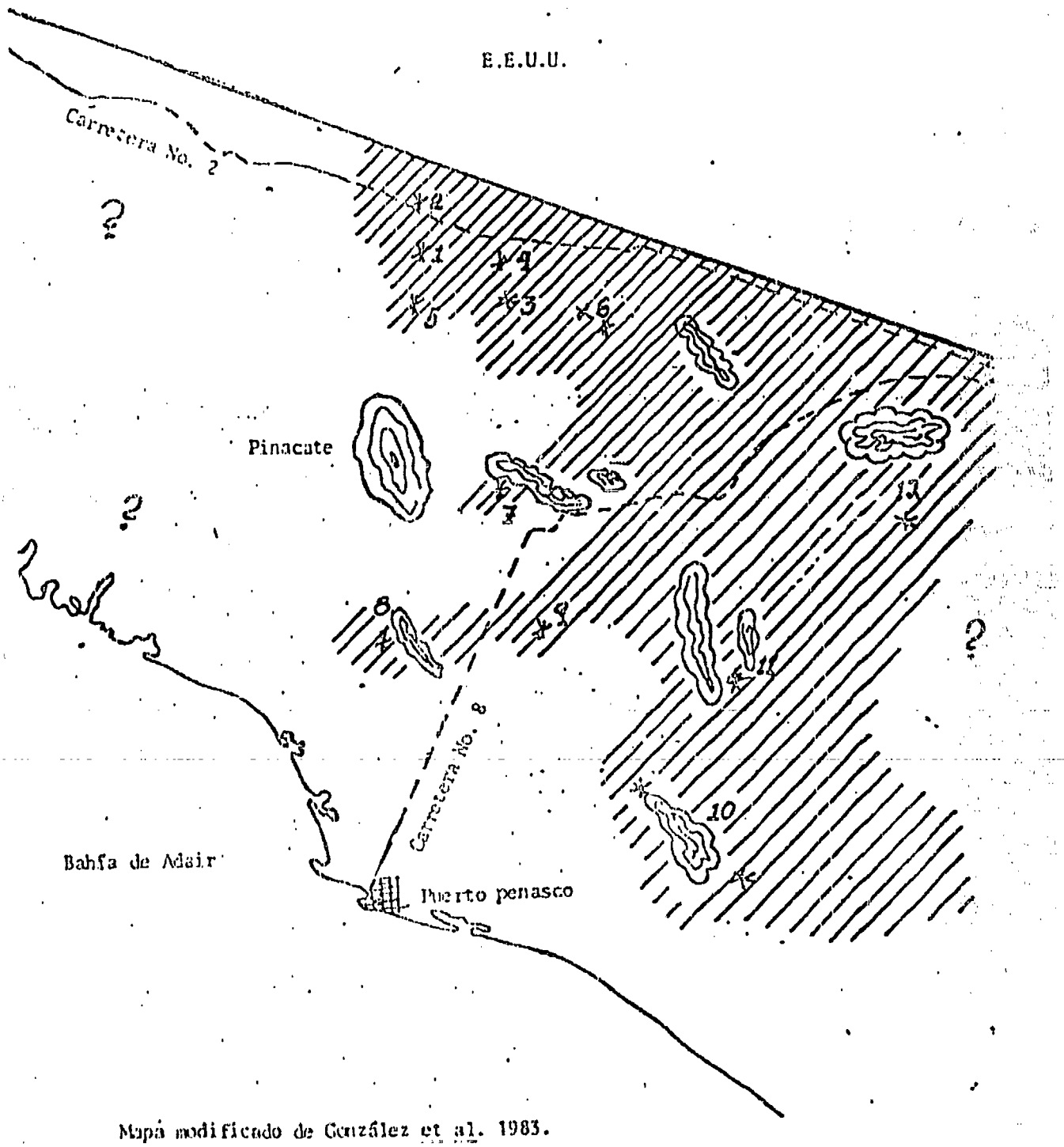
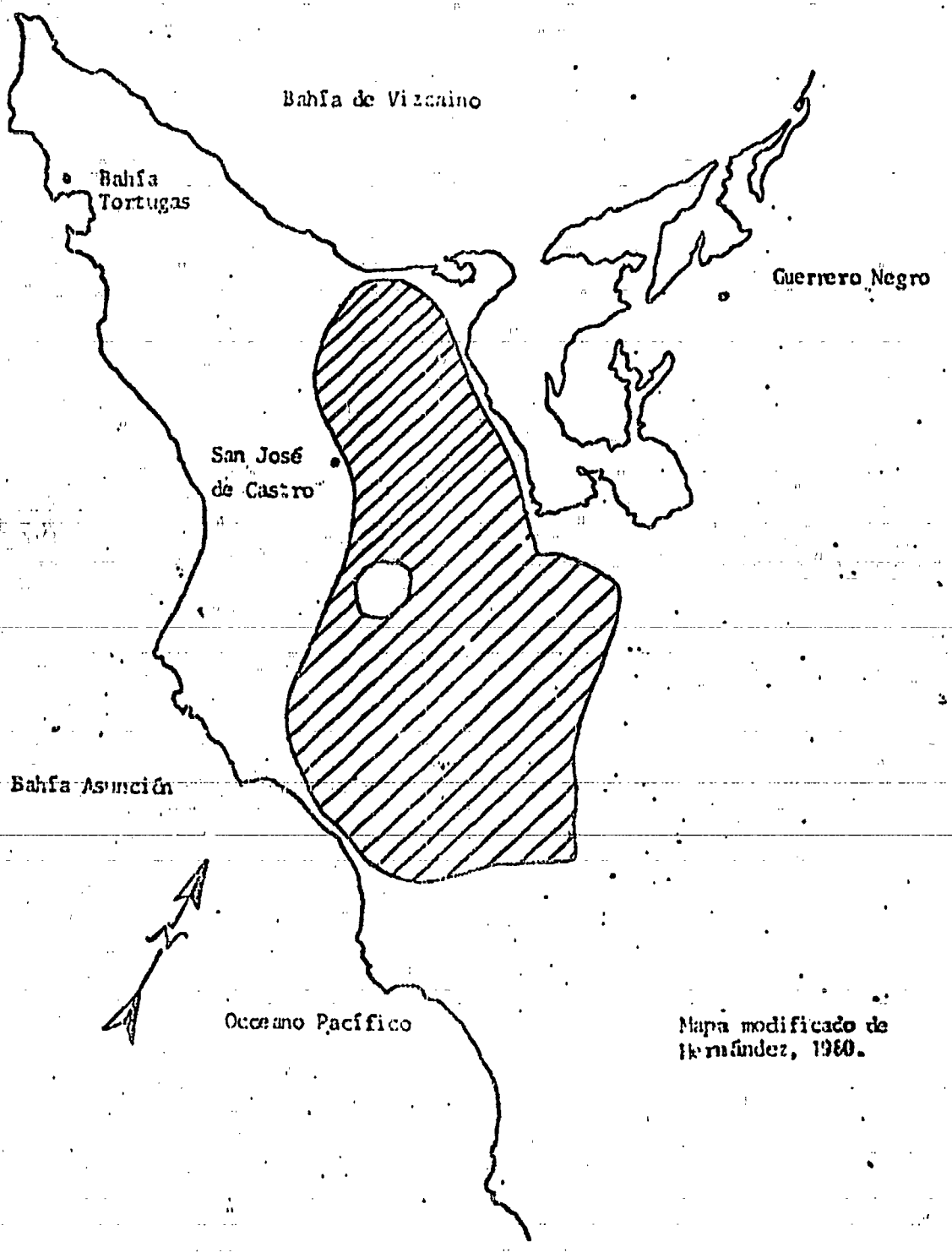


Figura 4. Distribución de Antilocapra americana sonoriensis.



Mapa modificado de González et al. 1983.

Figura 5. Distribución actual de Antilocapra americana peninsularis.



A N E X O 3

Appendix 3

RESUMEN DE CENSOS REALIZADOS POR DIFERENTES AUTORES EN VARIOS PERIODOS SOBRE LAS POBLACIONES DE BERRENDO EN MEXICO.

Summary of censuses taken by different authors during different periods on the pronghorn populations in Mexico

BAJA CALIFORNIA

ESTIMADOS	VISTOS	LOCALIDAD	FECHA	FUENTE
500		B.C.S. y B.C.N.	1924	Nelson
100		B.C.S. y B.C.N.	1973	Sundstrom
	83	B.C.S.	1977	Hernández
	80	B.C.S.	1978	Hernández
menos de 100		B.C.S.	1978	Tinker
90	80	B.C.S.	1984	

CHIHUAHUA

ESTIMADOS	VISTOS	LOCALIDAD	FECHA	FUENTE
700		Edo. de Chihuahua	1924	Nelson
600		Edo. de Chihuahua	1973	Sundstrom
	561	Edo. de Chihuahua	1977	Treviño
	533	Edo. de Chihuahua	1978	Treviño
	143	Edo. de Chihuahua	1978	Hernández
menos de 400		Coahuila y Chihuahua	1978	Tinker
319	214	Chihuahua	1984	

SONORA

ESTIMADOS	VISTOS	LOCALIDAD	FECHA	FUENTE
	43	Región del Pinacate	1907	Hornaday
595		Edo. de Sonora	1924	Nelson
50		Desierto de Alta zona fronteriza	1954	Halloran
545		Edo. de Sonora	1954	Halloran
	30	Región del Pinacate	1971	May 1976 D.G.F.S.S.A.G.

ESTIMADOS	VISTOS	LOCALIDAD	FECHA	FUENTE
	70	Desierto de Altar	1971	May 1976 D.G.F.S.S.A.G.
	15	Región del Pinacate	1972	May
100		Edo. de Sonora	1973	Sundstrom
	51	Edo. de Sonora	1978	Hernández
102		Edo. de Sonora	?	D.G.F.S. SARH.
menos de 150		Edo. de Sonora	1978	Tinker
160	26	Región de Altar	1980	López
50	33	Región del Pinacate	1983	González et al
63	33	Sonora (Región de Altar)	1984	